U.S. Department of Transportation

Federal Highway Administration

Memorandum

Subject: **INFORMATION:** Highway Traffic Noise Prediction Vehicle Emission Levels

Date: May 6, 1999

From: Cynthia J. Burbank for James M. Shrouds
Program Manager, Planning and Environment

Reply to Attn. of: HENE

To: Division Administrators
Federal Lands Highway Division Engineers

Last March, the FHWA released the FHWA Traffic Noise Model, Version 1.0 (FHWA TNM). To create the data base for the FHWA TNM, the Volpe National Transportation Systems Center (Volpe Center) developed national Reference Energy Mean Emission Levels (REMELs) for 5 vehicle types, based on field measurements made at 40 sites in 9 States. During this development, State-specific REMELs were analyzed and found to be statistically equivalent to the national REMELs. Thus, there should not be a need for State departments of transportation (DOTs) to develop their own REMELs.

As stated in *Measurement of Highway-Related Noise*, dated May 1996, "Until the design of highway vehicles changes incrementally, or regulatory requirements warrant lower noise emission levels, development of State-specific REMELs is unnecessary." Although it is not prohibited, State DOTs are strongly discouraged from developing and using State-specific REMELs in the FHWA TNM. However, if a State DOT desires to utilize State-specific REMELs in the FHWA TNM, it must complete the following steps, in order:

STEP 1: Notify FHWA of its desire to develop State-specific REMELs;
STEP 2: Submit a detailed REMEL measurement plan to FHWA for review and approval;
STEP 3: Conduct field measurements and develop REMELs; and
STEP 4: Submit measurement data and analysis, along with the resulting REMELs, to FHWA for review and approval.

The REMELs must be developed in accordance with the procedures outlined in the report *Measurement of Highway-Related Noise*. The detailed REMEL measurement plan must demonstrate a thorough knowledge of the procedures, including their precise application to the measurements at hand. The plan must include a complete discussion of all the items contained in the attached "Requirements for a REMEL Measurement Plan."

If you have any questions concerning the development of State-specific REMELs, you may contact Bob Armstrong or Steve Ronning at (202) 366-2073 or (202) 366-2078, respectively.

Attachment

cc: Resource Center Directors

REQUIREMENTS FOR
A REMEL MEASUREMENT PLAN

1. SITE SELECTION: Identify a minimum of five unique measurement sites for each vehicle type.

a. Characteristics of the Selected Sites:

Describe the identified measurement sites, including the approximate ambient noise level at each site.

b. Microphone Location:

Identify the locations of all measurement microphones.

c. Observer Station Location:

Identify the location of the observer station relative to the microphones, as well as the location of all instrumentation at the observer station.

d. Vehicle Types:

Indicate which FHWA TNM vehicle types and/or user-defined vehicle types will be measured.

2. INSTRUMENTATION:

List all equipment to be used in the measurements, including the manufacturer, model, and date of last calibration, if applicable, for each item.

3. SAMPLING PERIOD:

a. Event Quality:

Identify the rise and fall in the noise-level time-history trace for each event. (NOTE: An instrument capable of measuring and storing the sound level time history, e.g., a graphic level recorder, must be used to establish event quality, and measurements may only be made for vehicles passing in the nearest lane of travel).

b. Minimum Separation-Distance:

Indicate the minimum separation-distance between vehicles, which will be used for each event. (NOTE: A minimum separation distance of 400 feet between like-vehicles and a minimum separation distance of 1,000 feet between automobiles and heavy trucks are required).

c. Number of Samples:

Identify the minimum number of samples which will be obtained for each vehicle type across the speed range of 10-70 mph, in 10 mph increments. (NOTE: 2,825 automobiles, 765 medium trucks, 2,986 heavy trucks, 355 buses, and 39 motorcycles were sampled in the development of the national REMELs).

4. MEASUREMENT PROCEDURES:

Describe the step-by-step procedures which will be used for all field measurements.

5. DATA ANALYSIS:

a. Calibration and Compilation:

Show how the measurement data will be adjusted for calibration drift and merged for analysis and the development of REMEL regression equations.

b. Development of REMEL Regression Equations:

Show how regression analysis of the measurement data will be used to develop a REMEL equation for each vehicle type.